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L61 ANSWER 1 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN
AN 1999:788327 CAPLUS
DN 132:5687
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TI Preparation of mold-releasing agent for concrete from industrial wastes
IN Yi, Rongchuan
PA Peop. Rep. China
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 7 pp.
CODEN: CNXXEV
DT Patent
LA Chinese
IC ICM B28B007-38
CC 58-2 (Cement, Concrete, and Related Building Materials)
Section cross-reference(s): 17, 38, 51, 60
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1129633	A	19960828	CN 1995-101952	19950225 <--
PRAI	CN 1995-101952		19950225		

AB The agent contains high C alc. mixture 10- 100, vegetable oil wastes 0-25, waste engine oils 0-75 parts, alkali proper quantity (making the pH of the emulsion = 8-9), and water proper quantity (controlled by the concentrate of emulsion); where the mixed high C alc. mixture is a mixture of high C alc. wastes from various sources; the vegetable oil wastes are from oil and fat plants; the waste engine oils are used light and middle machine oils; and the alkali is inorg. alkali and/or organic alkali. Preferably, the high C alc. mixture is from a chemical plant producing lauryl alc. with coconut oil as raw material; the vegetable oil waste is from linseed oil, castor oil, tung oil, colza oil, soybean oil, peanut oil, cottonseed oil, palm oil, corn oil, and sunflower oil; the waste engine oil is 10#, 20#, 30#, and 40# used engine oil; the alkali may be NaOH, KOH, NH4OH, ethanolamine, di-ethanolamine, tri-ethanolamine, and their aqueous solns., and the concentrate of the agent emulsion is 10- 30 weight%. The agent is prepared by mixing the raw material, allowing the mixture to react at 100° for 2-24 h, adding proper amount of water under stirring at 95° to obtain gelatinous emulsion or oily liquid having pH 8-9.

ST mold releasing agent concrete industrial waste; recycling lauryl alc vegetable oil mold releasing agent; engine oil waste mold releasing lubricant

IT Lubricating oils
(crankcase, used, waste, raw material; for preparation of mold-releasing agent for concrete from industrial wastes)

IT Wastes
(industrial; preparation of mold-releasing agent for concrete from industrial wastes)

IT Lubricants
(mold-release; preparation of mold-releasing agent for concrete from industrial wastes)

IT Recycling
(preparation of mold-releasing agent for concrete by recycling industrial wastes)

IT Concrete
(preparation of mold-releasing agent for concrete from industrial wastes)

IT Castor oil
Corn oil
Cottonseed oil
Linseed oil
Palm oil
Peanut oil
Rape oil

Soybean oil
Sunflower oil
Tung oil
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(waste, raw material; for preparation of mold-releasing agent for concrete from industrial wastes)

IT 102-71-6, Tri-ethanolamine, processes 111-42-2, Di-ethanolamine, processes 141-43-5, Ethanolamine, processes 1310-58-3, Potassium hydroxide (KOH), processes 1310-73-2, Sodium hydroxide (NaOH), processes 1336-21-6, Ammonium hydroxide ((NH4)(OH))
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(raw material; for preparation of mold-releasing agent for concrete from industrial wastes)

IT 112-53-8, Lauryl alcohol
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(waste, raw material; for preparation of mold-releasing agent for concrete from industrial wastes)

RN 102-71-6
RN 111-42-2
RN 141-43-5
RN 1310-58-3
RN 1310-73-2
RN 1336-21-6
RN 112-53-8

L61 ANSWER 3 OF 3 WPIDS COPYRIGHT 2004 THOMSON DERWENT on STN
AN 1997-550715 [51] WPIDS
DNN N1997-458913 DNC C1997-175773
TI Mould releasing agent and process for creating concrete from industrial wastes.
DC L02 P64
IN YI, R
PA (YIRR-I) YI R
CYC 1
PI CN 1129633 A 19960828 (199751)* B28B007-38 <--
ADT CN 1129633 A CN 1995-101952 19950225
PRAI CN 1995-101952 19950225
IC ICM B28B007-38
AB CN 1129633 A UPAB: 19971222
The method for preparing demoulding agent of concrete with industrial waste such as mixed high- carbon alcohol, plant oil foot and waste machine oil includes such steps as mixing the mixed high-carbon alcohol and plant oil root with alkaline solution, heating for reaction, and mixing with water and waste machine oil. It features high demoulding effect and low cost.
FS CPI GMPI
FA AB
MC CPI: L02-D04

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PTO 04-2682

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MANUFACTURE OF CONCRETE MOLD-RELEASE AGENT USING WASTE INDUSTRIAL MATERIALS AND MANUFACTURING TECHNOLOGY THEREOF

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MANUFACTURE OF CONCRETE MOLD-RELEASE AGENT USING WASTE INDUSTRIAL MATERIALS AND MANUFACTURING TECHNOLOGY THEREOF

[Zongheliyong gongyefeiliao shengchan hunningtu tuomoji ji qi zhibeigongyi]

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[There are no amendments to this patent.]

Claims /1*

1. A type of concrete mold-release agent characterized by the following facts: the mold-release agent is manufactured using waste industrial materials, including mixed higher alcohols, bottom vegetable oil, and waste engine oil together with an appropriate amount of alkali and water; the weight ratios of these components are as follows:

mixed higher alcohols: 10-100 parts

bottom vegetable oil: 0-25 parts

waste engine oil: 0-75 parts

alkali: an appropriate amount such that the PH of the finally obtained emulsion is in the range of 8-9

water: an appropriate amount based on the concentration of the emulsion needed by the product;

the sources of the mixed higher alcohols are the remnants of various types of mixed higher alcohols; the bottom vegetable oil can be any remnant vegetable oil generated when oils and fats are purified in various types of vegetable oil and fat plants; the waste engine oil can be

* [Numbers in the margin indicate pagination of the original language text.]

the light and medium mechanical oil used by various types of machines; the alkali can be an inorganic alkali or an organic alkali or their mixture.

2. The concrete mold-release agent described in Claim 1 characterized by the fact that the mixed higher alcohol is the mixed higher alcohol of a chemical plant that produces dodecanol using coconut oil as the raw material.

3. The concrete mold-release agent described in Claim 1 characterized by the fact that the bottom vegetable oil is selected from linseed oil, castor oil, tung oil, Chinese catalpa oil, colza oil, soybean oil, peanut oil, cottonseed oil, palm oil, corn oil, sunflower oil, and bran oil.

4. The concrete mold-release agent described in Claim 1 characterized by the fact the waste engine oil is selected from 10#, 20#, 30#, and 40# engine oils.

5. The concrete mold-release agent described in Claim 1 characterized by the fact the alkali is caustic soda.

6. The concrete mold-release agent described in Claim 1 characterized by the fact the alkali is selected from sodium hydroxide, potassium hydroxide or their aqueous solutions, ammonia water, ethanolamine, diethanolamine, and triethanolamine.

7. The concrete mold-release agent described in any of Claims 1-6 characterized by the fact that the concentration of the emulsion of the mold-release agent is in the range of 10-30% (weight).

8. A technology for manufacturing concrete mold-release agent characterized by the following facts: waste industrial materials, including 10-100 parts (weight, same below) of mixed higher alcohol and 0-25 parts of bottom vegetable oil, are mixed with an appropriate amount of alkaline solution (the amount of the alkaline solution varies depending on the composition percentages of the two waste materials such that the PH of the emulsion obtained after the end of the reaction is in the range of 8-9); the mixture is allowed to react at a temperature ranging from room temperature to 100°C for 2-24 h; after the end of the reaction, an appropriate amount of water is added at a temperature ranging from room temperature to 95°C (the amount of water is determined based on the concentration of the final product), followed by stirring to obtain a concrete mold-release agent in the form of a gel-like emulsion or an oily liquid with a PH = 8-9; the color of the mold-release agent can vary depending on the colors of the waste materials used. /2

9. The technology for manufacturing concrete mold-release agent described in Claim 8 characterized by the following facts: waste industrial materials, including 10-100 parts of mixed higher alcohol and 0-25 parts of bottom vegetable oil, are mixed with an appropriate amount of an alkaline solution; the mixture is allowed to react at 100°C for 2-3 h; after the end of the reaction, an appropriate amount of water is added at a temperature in the range of 85-95°C,

obtaining a concrete mold-release agent in the form of a gel-like emulsion or an oily liquid with a PH = 8-9.

10. The technology for manufacturing concrete mold-release agent described in Claim 8 or 9 characterized by the following facts: waste industrial materials, including 10-100 parts of mixed higher alcohol and 0-25 parts of bottom vegetable oil, are mixed with an appropriate amount of an alkaline solution; the obtained mixture is allowed to react; after the end of the reaction, an appropriate amount of water is added, and 0-75 parts of waste engine oil is added, followed by mixing homogenously to obtain a concrete mold-release agent in the form of a gel-like emulsion or an oily liquid with a PH = 8-9.

Specification /1

The present invention pertains to a chemical reagent used for construction materials. More specifically, the present invention pertains to a mold-release agent for precast concrete and its manufacturing method.

Concrete mold-release agent is needed during the process of manufacturing a precast concrete. It can prevent or reduce adhesion between the concrete and the surface of the molding plate in order to improve the quality of the product, lower the intensity of work, and increase the manufacturing efficiency. Concrete mold-release agents have been studied extensively both domestically and in foreign countries. The concrete mold-release agents reported in the references can be roughly classified into fatty acid sodium, oily emulsion, and organic resins, etc. However, almost all of these concrete mold-release agents are manufactured using regular chemical raw materials. Therefore, the manufacturing cost is high, and the cost effectiveness is poor.

On the other hand, many chemical plants (such as those manufacturing dodecanol using coconut oil as the raw material) have mixed higher alcohol wastes that are difficult to dispose of. Such waste material is in the form of a wax-like solid that is insoluble in water and contains a large amount of mixed sodium alcoholates and a small amount of hydrolyzed alcohols, waxes, coloring matters, as well as a small amount of other organic compound. Various types of vegetable oil plants (such as those manufacturing colza oil, tung oil, linseed oil, castor oil, Chinese catalpa oil, soybean oil, corn oil, soybean oil) will generate a large amount of bottom vegetable oils when purifying oils and fats. The main components of these bottom vegetable oils are oils and fats and phosphatide as well as a small amount of proteins, saccharide, wax, sterol, coloring matters, and organic and inorganic impurities. A large quantity of waste engine oils are generated in those industries using various types of machineries (such as various types of mechanical factories, electric power industry, transportation industry, light industry, chemical

industry, etc.). Comprehensive utilization is needed for these waste materials to avoid waste of resources and environmental pollution.

The purpose of the present invention is to manufacture concrete mold-release agent using waste industrial materials, including mixed higher alcohols, bottom vegetable oils, and waste engine oils, as the raw materials. In this way, the cost of the concrete mold-release agent can be reduced. In addition, it is able to turn "waste" into wealth by comprehensively utilizing the aforementioned waste industrial materials, that is, mixed higher alcohols, bottom vegetable oils, and waste engine oils to take full advantage of the resources and reduce environmental pollution. This is the most remarkable feature of the present invention. /2

The purpose of the present invention is realized as follows. The mold-release agent is manufactured using waste industrial materials, including mixed higher alcohols, bottom vegetable oil, and waste engine oil together with an appropriate amount of alkali and water. These materials can be mixed and processed at any ratio. They can also be processed and used independently, but better effect can be displayed when they are mixed. The proportion of each component can be made flexible according to the difficulty degree of releasing the mold of the precast concrete and the compositions of the waste materials themselves. In general, the weight ratios of these components are as follows:

mixed higher alcohols: 10-100 parts

bottom vegetable oil: 0-25 parts

waste engine oil: 0-75 parts

alkali: an appropriate amount such that the PH of the finally obtained emulsion is in the range of 8-9

water: an appropriate amount based on the concentration of the emulsion needed by the product.

The concrete mold-release agent is manufacturing using the following method. The waste industrial materials, that is, the mixed higher alcohol and the bottom vegetable oil are mixed with an appropriate amount of an alkaline solution (such as 50% aqueous solution of caustic soda) at an appropriate ratio (since the compositions of the waste materials are not very homogenous and stable and the types are not exactly the same, the amount of the alkali added should be adjusted appropriately such that the PH of the emulsion obtained after the end of the reaction, that is, the concrete mold-release agent is in the range of 8-9). The obtained mixture is reacted under heating. When the temperature reaches 100°C, a large amount of steam and a small amount of organic compounds with low molecular weights are volatized. The system is heated continuously for 2-3 h. The reaction is completed when almost all of the steam is removed. Water is added (in an appropriate amount depending on the final concentration of the emulsion) at a temperature in the range of 85-95°C, followed by mixing homogenously. Then, waste engine oil is added in an appropriate proportion, followed by mixing homogenously. As a result, a gel-like emulsion or an

oily liquid with PH = 8-9 is obtained as the concrete mold-release agent of the present invention (the color varies depending on the colors of the waste materials). The concentration of the emulsion is usually in the range of 10-30% (weight).

Among the waste industrial materials used in the present invention, the mixed higher alcohol waste can be any waste material containing higher alcohols, such as the remnant material generated when manufacturing dodecanol using natural coconut oil or the remnant mixed higher alcohols generated during petrochemical production. The bottom vegetable oil can be any /3
remnant vegetable oil generated when oils and fats are purified in various types of vegetable oil and fat plants. Examples include linseed oil, castor oil, tung oil, Chinese catalpa oil, colza oil, soybean oil, peanut oil, cottonseed oil, palm oil, corn oil, sunflower oil, and bran oil. The waste engine oil can be the light and medium mechanical oil used by various types of machineries. Examples include 10#, 20#, 30#, 40# mechanical oils, textile engine oil, freezer engine oil, turbine oil, and transformer oil. The alkali can be an alkali of any industrial grade. Examples include sodium hydroxide, potassium hydroxide or their aqueous solutions, ammonia water, ethanolamine, diethanolamine, and triethanolamine.

The concrete mold-release agent of the present invention shows relatively good mold releasing effect. We compared the performance of the concrete mold-release agent of the present invention with soap mold-release agent and emulsified oil mold-release agent. Since currently there is no unified test standard or method in our country, we can only directly observe their isolating effects at low concentration (such as the ability to reduce the viscosity and friction, the smoothness of the structural component, and the sticky ash situation on the molding plate). Therefore, each mold-release agent with a concentration of 3% (weight) was brushed under the same conditions in plural test cement molds, followed by pouring concrete into these molds. The mold was released after the concrete was hardened. The obtained isolating effect is as follows.

Emulsified oil mold-release agent > mold-release agent of the present invention (containing no waste engine oil) > soap mold-release agent

If 5% (weight) of waste 10# engine oil is added into the mold-release agent of the present invention while keeping other conditions unchanged, the isolating effect is as follows.

Emulsified oil mold-release agent = mold-release agent of the present invention (containing waste engine oil) > soap mold-release agent

The raw materials of the concrete mold-release agent disclosed in the present invention can be obtained easily. The concrete mold-release agent has good mold releasing effect, low manufacturing cost, and mature manufacturing technology. Also, the concrete mold-release agent will not contaminate the precast cement and will not corrode the molding plate. It is non-toxic and inodorous and will not cause environmental pollution. The concrete mold-release agent of the present invention will not degrade to have separated layers over long-term storage,

and there no need to change the original operating habit when using the concrete mold-release agent of the present invention. The concrete mold-release agent can be diluted to any concentration by adding water according to the difficulty degree of releasing the mold of the precast concrete. The concrete mold-release agent can be brushed after it is mixed homogenously. It can be used easily for releasing various types of molding plates. In addition, the comprehensive utilization of the waste industrial materials by the concrete mold-release agent of the present invention helps to find new applications for those waste industrial materials and saves a large quantity of regular chemical raw materials used in the manufacture of mold-release agents and also provides new types of mold-release agents for construction materials. Therefore, the present invention has relatively good economic and social benefits. /4

In the following, the present invention will be explained in more detail with reference to application examples.

Application Example 1

A 50% (weight, same below) aqueous solution of caustic soda was added into 100 parts (parts by weight, same below) of a mixed higher alcohol waste generated from a plant that produces dodecanol using coconut oil as the raw material. The amount of the aqueous solution was such that the PH of the emulsion obtained after the end of the reaction was 8-9. The mixture was heated to 100°C and maintained at that temperature for 2-3 h. The reaction was completed after almost all of the steam was removed. 400 parts of water was added at a temperature in the range of 80-90°C. The system was cooled off naturally, obtaining a mixed higher alcohol emulsion with a concentration of about 20% and a PH = 8-9. This emulsion can be used as the concrete mold-release agent.

Application Example 2

5 parts of ammonium carbide [sic; possibly ammonium carbonate], 3 parts of concentrated ammonia water (28%), and 2 parts of triethanolamine were added to 50 parts of bottom colza oil (weight, same below). The mixture was allowed to react naturally under stirring for 24 h, followed by adding 1000 parts of 20% mixed higher alcohol and mixing homogenously. Then, 50 parts of waste 30-40# engine oil was added, followed by mixing homogenously. After that, 400 parts of water was added, followed by mixing homogenously. As a result, an emulsion with a concentration of about 20% was obtained as the concrete mold-release agent.

Application Example 3

50 parts of 50% caustic soda was added into 200 parts of a mixed higher alcohol waste (such as the remnant mixed higher alcohol generated from a plant that produces dodecanol using

coconut oil as the raw material) and 180 parts of bottom palm oil. The mixture was heated to 100°C until the reaction was fully carried out (if necessary, additional caustic soda was added until PH = 8-9). Then, 750 parts of waste 10-20# engine oil was added, and the system was stirred homogenously at that temperature. After that, the system was cooled off naturally and was stirred continuously until the temperature dropped below 50°C. The obtained emulsified oil concrete mold-release agent was discharged and packed. This product is specially used on site at the places where concrete mold release is relatively difficult. An appropriate amount of water can be added on site as demanded to dilute the mold-release agent, which is brushed on the molding tool.